Problem of the Week

Problem D

This is the Year

The positive integers can be arranged as follows.

Row 1	1					
Row 2	2	3				
Row 3	4	5	6			
Row 4	7	8	9	10		
Row 5	11	12	13	14	15	
Row 6	16	17	18	19	20	21
$\vdots$						

More rows and columns continue to list the positive integers in order, with each new row containing one more integer than the previous row.

How many integers less than 2020 are in the *column* that contains the number 2020?

Did you know that the sum of the positive integers from 1 to n can be determined using the formula $\frac{n(n+1)}{2}$? That is, $1 + 2 + 3 + 4 + \ldots + (n - 1) + n = \frac{n(n+1)}{2}$. For example, the sum of the integers $1 + 2 + 3 + 4 = \frac{4(5)}{2} = 10$. This result can be verified by simply adding the 4 numbers. You can also easily verify that the sum of the first 5 positive integers is $\frac{5(6)}{2} = 15$.

This formula may be useful in solving this problem. As an extension, one may wish to prove this formula holds for any positive integer n.